commodity compares with that of thirty years ago, reference may be made to some statistics quoted by Dr. P. L. Simmonds in 1878. From these it appears that in the year 1870 the total imports of tortoiseshell (apparently of all descriptions) into the United Kingdom were 49,332 lbs., valued at 32,503*l.* It is also stated by the same writer, that in some years prior to 1878 the amount of the imports had reached the enormous total of thirty tons, with an estimated value of 74,000*l.* In 1870 the average price per pound was between thirteen shillings and fourteen shillings and sixpence; except Indian shell, which was only worth 7*s.* 9*d.* the pound. Dr. Simmonds likewise mentions that whereas about the year 1845 selected samples had realised as much as 3*l.* 3*s.* per pound; between that time and 1870 there had been a great fall in values, although towards the latter date they showed a tendency to rise. For instance, somewhat before that year good coloured shell from Zanzibar and Singapore had fetched from 28*s.* to 29*s.* 6*d.* per pound, and fair to good qualities of West Indian from 31*s.* to 41*s.* the pound.

According to the reports issued by Messrs. Lewis and Peat for 1898, the total amount of hawksbill tortoiseshell (that is to say exclusive of loggerhead shell, which is referred to later on) offered for sale in London during that year was about 76,760 lbs., practically all of which was sold. To arrive at the average price realised at these sales, would involve long calculations without affording any very compensative advantage. Attention may accordingly be directed to certain special values. The highest prices realised during the year were at the May sale, when selected Zanzibar and Bombay shell sold at from 67*s.* 6*d.* to 112*s.* 6*d.* per pound, while two pounds weight of specially selected Sydney and Fiji were disposed of at the rate of 100*s.* per pound. Whether these are record prices, we have no information; but they are certainly ahead of any of those quoted by Dr. Simmonds in 1878, 80*s.* per pound being the maximum value mentioned by him. The next highest price during 1898 was 95*s.* per pound for selected heavy Zanzibar and Bombay shell of a reddish tint, which was disposed of in the September sale. This value is followed by prices ranging between 45*s.*, 62*s.* 6*d.*, and 75*s.* for selected Nassau and Honduras shell in the West Indian class; Jamaica and Havana shell touching, however, as much as 77*s.* the pound. Of West Indian "hoof," the best Nassau and Honduras pale-coloured descriptions realised from 18*s.* to 27*s.* at their top price; while ordinary West Indian was a few shillings cheaper. On the other hand, Zanzibar and Bombay "hoof" ranged between 6*s.* and 17*s.* 6*d.* Some of the highest prices were realised by Nassau and Honduras "yellow-belly," which fetched between 67*s.* 6*d.* and 80*s.* in September, but had fallen to between 45*s.* and 65*s.* per pound by November. "Yellow-belly" is, or was, extensively used by Spanish ladies for large hair-combs, being often much more esteemed for this purpose than the mottled upper shell. Among all the classes of hawksbill tortoiseshell, that from Ceylon seems to have the lowest value; the general quotation being between 14*s.* and 17*s.*, although as much as 34*s.* has been obtained for selected samples.

The tortoiseshell yielded by the loggerhead turtle, of which 8200 lbs. were offered and about 7300 lbs. sold by Messrs. Lewis and Peat during 1898, is a much less valuable commodity than the produce of the hawksbill. During the year in question, the usual price per pound ranged between one and three shillings, although as much as 4*s.* 9*d.* was obtained in March. The upper plates of the loggerhead are much thinner than those of the hawksbill, and of a more or less uniform dark chestnut-brown, without marked translucency.

The statistics quoted above afford a good general idea of the vast extent and value of the London tortoiseshell trade. Unfortunately, it is impossible to give the total British imports and their value, since in the Board of Trade returns tortoiseshell, together with mother-of-pearl, is lumped with other shells, and the value of the mixed imports alone given. In addition to the British trade, the imports of other European countries (although, of course, some of these may have come from Britain) are very large. France, for instance, is a very large importer of tortoiseshell, the average annual amount taken during the ten years ending with 1876 being 42,306 kilogrammes, with a value of 2,078,910 francs. China and Japan are likewise large consumers of tortoiseshell, as is also America. The annual destruction of hawksbill turtles to supply the demand for this shell must therefore be enormous; but since, like most marine creatures, these reptiles are exceedingly prolific, it by no means follows that they are in any imminent danger of extermination.

As regards its employment in the arts and manufactures, tortoiseshell being very similar in its nature to horn, is in like manner made partially plastic before working by immersion in hot water in which salt has been dissolved. The natural curvature of the plates is removed by placing them under pressure between smooth boards while in this semiplastic condition, and allowing them to cool. But, in addition to its plasticity, tortoiseshell possesses the valuable property of welding; so that when a large superficies is required, two or more plates can be readily joined together in this manner. The *modus operandi* is first of all to bevel the adjacent edges of the two plates to be united in opposite directions, and then pressing the overlapping edges together in a metal press under the action of boiling water. So intimate is the union, that when the operation is properly performed, no trace of the division is visible. Nor is this all, for by the application of moist heat tortoiseshell may be made to receive impressions of any form by being squeezed between metallic moulds. Neither are the dust and shavings made in the course of the manufacturing processes useless, for these are placed in brass moulds, where, under moist heat and pressure, they become consolidated into a homogeneous mass of any form that may be desired. Necklaces and many other small fancy articles are made in this manner.

From its high price, it is important to economise as much as possible the material used in the manufacture of tortoiseshell objects. The following ingenious example of this is described by Dr. Simmonds. "In making the frames for eye-glasses, narrow strips of tortoiseshell are used, in which slits are cut with a saw; the slits being subsequently, while the shell is warm, strained or pulled open, until they form circular or oval apertures, by the insertion of tapering triblets of the required shape. The same yielding or flexible property is made use of in the manufacture of boxes, a round flat disc of shell being gradually forced, by means of moulds, into the form of a circular box with upright sides." The only objection to this process is that the colours become so darkened as to be almost black.

In the manufacture of small combs, again, a pair of these are cut out of a single piece of shell by means of a vertical cutter, working in such a manner, that the cores left between the teeth of one comb form the teeth of the other. Similarly in buhl-work cabinets, in which tortoiseshell is inlaid with brass, both portions of the former material cut out by the fret-saw are employed. Hence in a pair of cabinets the pattern of the inlaying is reversed; the tortoiseshell forming the ground-work and the brass the inlaying in one, while in the other the opposite arrangement occurs.

Formerly the manufacture of ladies' combs, especially those made for Spain and South America, formed a very important feature in the tortoiseshell industry, some of these being a couple of feet in width, and from six inches to a foot in height. In England, at any rate, large combs are now disused. Although for veneering purposes, when the colouring of the shell is intensified by a layer of coloured varnish or metallic foil beneath it, thin tortoiseshell is employed; the thick descriptions are those most favoured at the present day in the English market.

Finally, it may be mentioned that on the continent the shell of various species of land tortoises is employed more or less extensively for buhl-work, its colour being always intensified by a substratum of bright foil; and it is said that the same material has occasionally been employed for inlaying purposes in England. Imitation tortoiseshell is made by painting horn with a paste of lime, litharge, and soda, which is allowed to dry and then rubbed off. Dark spots of lead sulphide are thus formed in the horn, giving it a mottled appearance.

R. L.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—Prof. W. F. R. Weldon, F.R.S., has been appointed to the vacant Linacre Professorship of Comparative Anatomy, in succession to Prof. Ray Lankester, F.R.S.

Reading College, Reading, has been admitted to the privileges of an affiliated college.

Natural Science scholarships are announced for competition at the following colleges:—Jesus College, on April 18; Merton College, New College, and Corpus Christi College, on June 27.

The Curators of the University Chest have been authorised to guarantee an annual stipend of 100*l.* to a Demonstrator in Mineralogy, and to expend 90*l.* upon sanitary improvements in the Physiological Laboratory.

The annual grant to the Hope Department has been raised from 100*l.* to 110*l.*, and that to the Pitt Rivers Museum from 150*l.* to 200*l.*

The Board of the Faculty of Natural Science has issued new regulations relating to the special subjects of crystallography and mineralogy.

Mr. H. T. Gerrans has been elected a Delegate of the University Museum, and Mr. C. Leudesdorf a Visitor of the University Observatory. Mr. D. R. Wilson has been appointed lecturer in Chemistry at Magdalen College.

The 198th meeting of the Junior Scientific Club was held on Friday, February 24.—Mr. E. H. J. Schuster, New College, read a paper on "The heredity of acquired characters."—Mr. H. B. Hartley, Balliol, read a paper entitled "Notes on the origin of the Japanese." The author held that four waves of population have swept over Japan. The original inhabitants were a race of people who possessed the art of making pottery and lived in holes in the earth, roofed over with branches. These were completely driven out in prehistoric times by the Ainus, to whom the art of pottery making is still unknown. The Ainus were, in their turn, driven northwards or exterminated by an invasion of Mongols from Corea, and the latter now constitute the bulk of the population,—the round-faced type. Later still, apparently a second invasion of Mongols took place, and these, constituting the oval-faced type of Japanese, are now the aristocrats of the land. The antiquity of the first Mongol invasion is plainly evident; it is considered that the early Japanese, up to the fifth century, did not possess the art of writing.

CAMBRIDGE.—Mr. G. W. Walker, of Trinity College, has been elected to an Isaac Newton Studentship in Astronomy and Physical Optics.

The subject for the Adams Prize, 1901, open to all graduates of the University, is "Electric Waves." The successful candidate will receive about 225*l.*

Prof. Lewis has acquired for the Mineralogical Museum the Carne collection of Cornish minerals with their cabinets. The cost (475*l.*) has been almost entirely defrayed by contributions from members of the University and their friends, together with donations from the Clothworkers' and Fishmongers' Companies.

The Museums and Lecture Rooms Syndicate report on the urgent need of new buildings for the department of Botany, and propose that immediate steps be taken for their erection on the site recently assigned by the Senate.

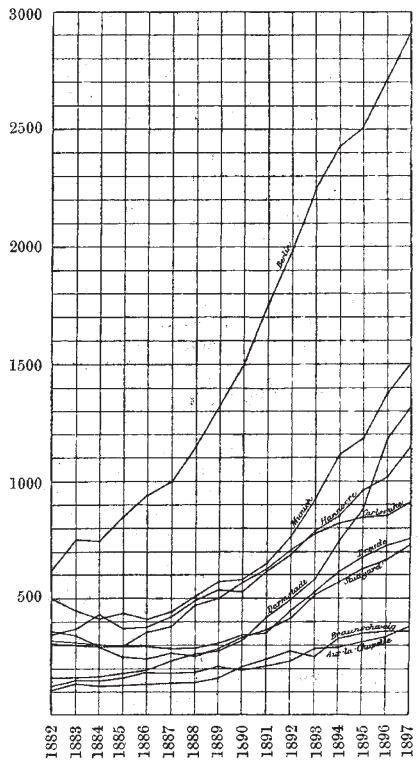
The Antiquarian Committee in like manner press for a new archæological museum, the present building, which was originally but a makeshift, being now utterly inadequate for the valuable ethnological and other collections.

A grant of 300*l* from the Works Travelling Scholars Fund is to be made to Mr. Skeat in aid of his scientific expedition to the Malay Peninsula.

WE understand that there is a vacancy in the Examinations Department of the City and Guilds of London Institute, for the post of assistant to the superintendent, from whom particulars of the appointment may be obtained. Applicants are expected to have graduated, and to have a sound knowledge of some branch of science and educational experience.

A COPY of the Calendar, for 1899, of the University of New Brunswick, Fredericton, has been received. Among the University medals, prizes and scholarships, we notice that a gold medal is offered for competition among undergraduates this year for the best essay on "The aims and methods of modern science." As showing how the alumini help their alma mater, we may mention that the Alumini Association has founded several scholarships and prizes, and that the graduation classes of 1894 and succeeding years have contributed various gifts to the University.

THE steady increase in the number of students who have taken up advanced courses of technical science in Germany during the past fifteen years is shown in the accompanying diagram, reproduced from an article on the new laboratories of the Zürich Polytechnic, contributed to the *Revue Générale des Sciences* by M. Pierre Weiss. There are in Germany nine polytechnics—it is hardly necessary to explain that they are concerned with much more advanced work than our polytechnic institutions—the one having the smallest number of students



Number of students in German Polytechnics every year from 1882 to 1897

being Brunswick, with 363 students, while Berlin, with 2906 students, is the most frequented. The total number of polytechnic students is 10,000. If the average period of study is taken to be three years, the number of trained technical men who become available every year is thus about three thousand. The diagram shows clearly the uniform rise in the number of students of industrial science in all the German polytechnics since about 1886 or 1887.

SCIENTIFIC SERIALS.

Symons's Monthly Meteorological Magazine, February.—Results of meteorological observations at Camden Square (North-west London) for forty years, 1858-97. This is a second series of tables containing the means and other details for each separate year, while the former series contained only the averages, &c., for the whole period. The results now published will be very valuable for reference. The present number contains the observations for January.—Climatological records for the British Empire in 1897. The table contains the results for sixteen representative localities. Most of the extremes have occurred at the same stations in other years. The highest temperature in the shade was 110°·8 at Adelaide, and the lowest −41°·0 at Winnipeg; the former was also the driest station, mean humidity 59, and had the highest temperature in the sun, 166°·3. The dampest station was Esquimalt, mean humidity 86. The greatest rainfall, 83·64 ins., occurred at Grenada, and the least, 14·22 ins., at Malta. Strange to say, Grenada had the least cloud, average amount 2·5. This value is unprecedented in the last twenty-one years, the nearest approach to it being 2·9 at Malta, in 1885.

Wiedemann's Annalen der Physik und Chemie, No. 1.—Susceptibilities of some metals, by E. Seckelson. The magnetic susceptibility of all metals examined is independent of the field in a direction normal to the lines of force.—Structure of the kathode light and nature of Lenard's rays, by E. Goldstein.